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PRODUCTION.

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JANUARY 11, 1888.

HON. T. F. BAYARD,

Secretary of State, Washington, D. C.

SIR:

The closer we get to the people in international inquiries into the economy of production the more we realize how great the influence which habits, association and inherited views exercise upon the formation of national character.

The methods employed in production are largely governed by these causal influences. They impress their stamp upon the output even, on the work measured quantitatively and qualitatively. This becomes clear to us, when we observe the people engaged in their daily occupations. The busy marts of life, the shop and the factory alone can supply the requisite measure for an understanding of the relative positions nations occupy in the industrial progression of their time. The aim and end of all industrial activity are the supplying of food, clothing, shelter and necessities of life to the worker and his dependents. What we call luxuries are only the necessities of a more advanced state of civilization. A people's state of civilization can therefore be measured best by what its working classes consider necessities of life, or their standard of living. The working classes pre-eminently. It must be taken for granted that the well-to-do classes enjoy in all times and zones relatively the sum and substance of comforts known to their age. Varying as this standard of living is, varying as the wants of nation and nation, time and time, zone and

zone are, so we find with the greater or smaller force of this incentive, activity increase and prevail with greater or smaller force. Under this varying standard we find the widest divergence both in the demands of the laborer and in the product of his activity by which he supplies these wants. What by one would be considered comfort and plenty another nation's standard would stamp as poverty and want.

If we have, therefore, no common standard of living, of the wants, we have a still more varying standard of production, of the means employed for supplying the wants. The results of a day's labor in one and the same industry per hand employed in different countries are of a most diverging nature. In one and the same line differences are so pronounced that it becomes at once apparent that the old standard of measurement, from which economic deductions have usually been made, the day wages, is entirely illusory. The means employed, the tools, machines, and methods are seldom the same. Even when apparently the same agents and methods are employed, on examination we find that they differ in their nature, or employment, or in both, so materially that no reliable comparison and deductions could be made from the mere fact of the employment of these agencies in production.

It may be taken for granted that in cotton manufacture the same kind of machinery is employed in America, England, Switzerland, Germany and France. The same power is likewise employed for speeding the machinery. Steam-power in England, Germany and France, and water-power supplemented by steam-power in America and Switzerland. The day earnings of the operatives (weavers) vary so much between one country and another that weavers in Switzerland earn but $2\frac{1}{4}$ to $2\frac{1}{2}$ francs (44 to 49 cents), in Germany on an average 2 marks (48 cents), in French mills $2\frac{3}{4}$ to 3 francs (53 to 58 cents), with a working day from five o'clock in the morning to half past seven in the evening, and $2\frac{1}{2}$ hours of rest in the day; in England about 65 cents, with nine working hours, and in America from 80 cents to \$1.12½ a day of ten working hours. If all things were equal, if with

the same machines and working agencies the results of a day's work per hand employed were the same, of course the countries where the higher earnings prevail would be in a hopeless condition in competing with the others. The above-mentioned factors, however, exercise so powerful an influence that the reverse is the truth. In fact, the cheapness of the labor product stands in an inverse ratio to the weekly earnings of the operative. The cost of weaving—in wages—of one kilogram of print cloth, $15\frac{1}{2}$ yards, 64×64 standard, in Switzerland is 50 centimes, $9\frac{2}{3}$ cents, or .606 cents a yard. For Germany I have not been able to obtain data for this count and width. Printers in Mulhouse and Elberfeld tell me when they use it for export they get it mostly from England,—a drawback of the duty paid to the government is given upon re-exporting the prints. This sufficiently proves that the cloth cannot be made at less cost in Germany. In England 22*d*, or 44 cents, is paid per cut of 80 yards, equal to .55 cents per yard. In America 20 cents is paid per cut of 50 yards (from another source I have 18.15 cents per cut of 45 yards), or .40 cents a yard as the weaver's wages. Putting daily earnings side by side with the labor cost of weaving we have

	Daily wages.	Wages per 100 yds.
In Switzerland, and we may include Germany.....	\$0.44 to \$0.49	\$0.606
In England.....	65	55
In America.....	80 to 1.12	40

From this we have a right to conclude that the average rate of wages customary in the country, the supplying of the wants and necessities of life, must have a direct bearing upon the productive power of the people—the operatives. I confine myself here strictly to this induction—and specific case. And here this is demonstrable to an absolute certainty. The number of looms operated by one weaver is :

In Switzerland two to three for the more expert weavers,

In Germany and France two and very seldom three,

In England three, and for expert weavers four.

And in America six to eight looms.

The work account of a mill in Lowell, for which I am indebted to the kindness of the lamented Mr. Dupee, the late treasurer of the Hamilton Mills, gives me

232 girls operating 6 looms.

43	"	"	7	"	
20	"	"	8	"	and only
11	"	"	5	"	each.

This shows that the high standard of working power in America is very widely distributed. The speed of the looms has been held to be so much greater in England than in America, that thereby the advantages gained by the running of a greater number of looms by one hand becomes neutralized in a measure. Even this I do not find to be the case. In America 180 picks a minute is the average, and some run as high as 210 picks a minute. In England 200 is considered very high speed, run by the best and most improved looms. Whatever objection might be raised on this point would be met by the weekly output as given by the earnings, which are piece price earnings and not day wages. In England, taking \$3.90 as the average of weekly earnings, at the rate of 55 cents per 100 yards the weekly output would be 709 yards of print cloth. In Switzerland, taking \$2.80 as the average earnings of weavers, at the rate of 60 cents per hundred yards the weekly output would be 466 yards; while in America, taking 6 looms indicating a low average, or \$4.86 (as taken from the pay-rolls of my informant) at the rate of 40 cents per 100 yards the weekly output would be 1,200 yards of print cloth per weaver. The average number of looms worked in this mill by one weaver is $6\frac{1}{4}$, with the earning proportionately raised to \$5.08, brings the output to 1,270 yards. In the spinning of the yarn for this cloth I find about equal cost of labor per pound in English and American mills and a higher cost in Switzerland. The time earnings stand relatively in the same positions with the respective countries as in the weaving, necessarily indicating higher individual exertion, skill, energy or whatever term we may apply to cover this economic manifestation.

I speak here of a branch where the same plant and technic is assumed to be used by competing nations—enjoy-

ing relatively the greatest amount of social, intellectual and political advantages of the age—and still how different are the results of exertion aided by the same motors and appliances.

If equally accurate data were at hand for the lowest stratum of wage earners—the operatives in the cotton mills of India—a still stronger verification of this parallel could undoubtedly be brought out. The fact of the great spread of cotton manufacture in the last decade is attributed to the low wages and to the depreciation of silver. With the latter imputed cause I have not to deal here, though I may say incidentally that the price of cotton in Liverpool or Manchester would never be affected thereby in any but a nominal way. Ten dollars worth of India cotton would bring, let us say, \$7.00 gold, plus freight and charges, in Liverpool, and re-exported to Bombay in the nature of yarn or cloth be again \$10.00 in silver plus labor—and freight and charges. The differences in exchange could only bear upon the added items. Freight charges even would be subject to the same nominal influences as the price of cotton. It is a fact, however, that India works successfully only the coarser yarns, Nos. 10 to 20, where the least labor is expended in the pound of cotton, while the finer numbers are imported from England in a larger degree even than the spread of Bombay cotton manufacture. Now the spinning wages in one hundred pounds of cotton yarn in Fall River are

For No. 14.....	\$0.33	For No. 20.....	\$0.45
For " 16.....	.35	(And in Lancashire for No. 20.....	.50)
For " 18.....	.40	For No. 40.....	.98

India has the seeming advantage of freight. The average rate of freight the year around on a ton of cotton from Bombay to Liverpool is 22 / 6 or \$5.46. Freight from Liverpool to Bombay of a ton of yarn is 12 / 6 or \$3.06, total \$8.52, or about the spinning wages in Lancashire and Massachusetts for the coarse numbers made in Bombay. This apparent protection, however, is almost offset in the higher cost of coal, higher cost of mill property and machinery, superintendence, etc.

Practically it may be said, therefore, that the basis of cost, the material, upon which labor operates in India, offers only slight advantages to the home spinner. The difficulties of the Bombay manufacturer increase with the increase in the ratio of labor to the pound of cotton. There, the greater productivity, relative cheapness of high-cost labor, shows itself in its greater potency. In lieu of a more specific and more closely defined measure, we may take the relative output.

A mill in Bombay, of which I have an account, of 35,000 spindles turns out 8,000 pounds of No. 20 yarn a day. Against this we may set a mill in Lowell of 110,000 spindles, spinning 160,000 pounds of cotton into No. 38 yarn—allowing 15 per cent. for waste net 140,000 pounds of yarn a week or about 23,300 pounds a day. Reduced to 35,000 spindles, 8,100 pounds—a slightly greater output in No. 38 in Massachusetts than in No. 20 in Bombay. The spinning wages in Massachusetts per pound of No. 20 yarn are 45 cents (in Lancashire 50 cents), and per pound of No. 38 yarn 87 cents. This means that, irrespective of the number of hands employed for an equal quantity of work produced, the same plant and improved machinery turn out in a given time 200 yards of yarn in Massachusetts against a trifle over 100 yards in Bombay.

If this be so, when we deal with what is apparently like and like, how much more are we justified in expecting quite important modifications of ruling impressions when we examine into industries which are conducted among different nations by entirely different methods. Here we find one nation clinging tenaciously to small domestic industries, the people work in family groups or masters with helpers, some still employ hand tools of ancient construction, others use modern inventions and labor-saving machinery made serviceable for domestic industry. Along with this the factory runs. But even here the use made of machinery is quite different in one country from what it is in another.

Here the insufficiency of the commonly adopted standard of measuring relative efficiency, *i. e.* productivity of labor, or cheapness, by the rate of wages becomes more distressing yet.

In a sense more closely allied in methods of proceeding to the just-mentioned industry than what I shall point out below, is calico printing. In Elberfeld and Mulhouse the work is conducted practically on the same principle as in Lowell, Fall River, Providence, etc., by printing machines with engraved copper rollers driven by steam. Yet I was told by owners of extensive print works at both places in Germany, that it is useless for them to attempt competition with America in neutral markets. That they had lost the Mexican market and would run the same risk elsewhere where American Cloth, width and quality, have established markets. They cannot compete in price. From the rate of wages standard this would seem incredible. In Lowell print-works, which I visited, a printer gets \$4.50 a day. In Mulhouse not above one-third; in Elberfeld not much over one-fourth would be the day wages of a printer. Truly a formidable difference. When, however, we know that one printer at \$4.50 and a helper at \$1.50, suffice to tend one printing machine, and that one printing machine, printing up to three or four colors turns out daily 400 pieces of print of 50 yards or 20,000 yards, and in prints used for furniture, etc., with eight to twelve colors printed simultaneously, 250 pieces or 12,500 yards, then we see how immaterial the question is whether the wages for tending the printing machine are \$6, \$3, or \$4, .03, .015, or .02 cents per yard. The labor cost becomes here a vanishing quantity on the one side, while on the other side causes may come in which make it an important factor, even if nominally of a very low rate. The German printers say that they cannot work on the American basis of running for days and weeks one pattern on one machine. They have to run much slower, use more time and care. They have to collect their trade from almost every country in the world. It comes in dribblets. They have to accommodate themselves to everybody's whims, make patterns, styles, and colors for every zone and taste. The large trade is in the hands of England, and they can only obtain and retain trade by ready acquiescence to all the exactions of fashion in the finer prints or national predilections in the cheaper goods. This not alone increases the cost of

production, but perhaps to a greater extent yet, the cost of distribution, and may be called a new element of disturbance in making comparisons in like industries among different nations. Methods in distribution as well as methods in production. They are dissimilar in every country and both have their influence on prices and cost of production.

Along with this advanced system of printing, bearing such different results so far as price-making is concerned, runs block printing yet to a considerable extent. Apparently hopelessly expensive if brought in competition with roller printing—still under certain conditions it may be much cheaper—or no other process applicable. Roller printing would be ruinously expensive in a small output or applied to a small industry of a changeable nature.

We have found all of these divergences in reviewing manufacturing conducted by similar methods. How much greater must we expect these divergences to be when we compare production conducted here by an industrious toiler with his hand tools; there with improved hand machinery; and in another place by minute subdivisions of the best organized labor, aided by machinery of the subtlest construction or by automaton, which with iron teeth and fingers cut steel and copper, turn screws, nails, pins, make the heads, sharpen the points and drop the finished work into a ready receptacle, or cut iron and twist and knit it into chains, &c. The labor employed here consists simply in putting a coil of wire or a rod of steel or copper into the machine, which then does all the work with greater regularity and precision than the most skilled workman could do by hand. In more complicated work than the making of these units great skill is required of the workers under both systems. Still it is skill of quite a different nature—the one in doing one and the same kind of work repeatedly day in and day out, like the automaton which makes the parts; the other—in making a complete piece of assembled parts inclusive of the parts. Great as the skill and technical knowledge must be of making a complete piece of so fine and subtle a mechanism as a watch or a clock by hand with hand tools, the skill required in the

manipulation of the other system is of an equally high though of a different character. In the assembling room of an American clock factory I found one girl putting together the parts of 240 movements as one day's work. This requires great dexterity and exactness. The work in all the manipulations is paid for by the piece. High earnings can only be obtained by great quickness, deftness and uninterrupted attention and application, qualities which again can be supplied by none but the best conditioned labor, enjoying the highest standard of living. Nowhere is so high a degree of intelligence and brightness in manner, looks and appearance observable among work people as where these conditions prevail, where the highest known earnings in like industries lead to the lowest cost of labor. A clock is sold at 90 cents, an alarm-clock is sold at retail at \$1.25, a Waterbury watch at \$2.50. It is the surprise of Europe. The factory sells it at \$1.50 to the retailer. On a recent visit to the factory I was shown all the numerous operations of the manufacturing process. The material is all worked from the plainest condition. It enters the factory as rolled steel and brass, and sheet-iron, and leaves it as a well-regulated watch in a paste-board box lined with colored satin. The making of the spring, of the wheels, screws, pins, pinions, the perforating of the plates, &c.; the assembling, the finishing, the regulating, all are done with as much care and precision as if for a piece of five times the value. Yet all these collected processes do not cost in labor more than 50 cents a watch. The company has a pay-roll of \$4,500 a week, and turns out 1,500 watches a day, or 9,000 a week, which makes the labor exactly as stated. The machinery is as interesting a study as the labor employed in the making and furnishing of this product of skill and enterprise. The number of people employed in the factory is 420, fully one-half of whom are women. The average earnings are \$10.71, which is about four times as high as in the Black Forest or in Switzerland. Here the lower cost is not due to cheap wages but to excellent machinery and skill and great quickness of labor employed at a very low cost by the piece. The great variety and complexity of machinery

and consequent great expense of plant can be borne profitably because of the very large output. The labor, the machinery turning uninterruptedly the same work is here employed and utilized to the full. Improvements in machinery follow on one another's heels when they are so profitable that, for instance, two machines and two men make 1,200 to 1,500 springs a day, while a short time ago, now on obsolete machinery, it took twelve men to turn out 1,000 springs. Neither in the Black Forest nor in Geneva have I seen machinery, meant for the same purpose, utilized in any way approaching that in which it is utilized in America. Nor does hand labor move with the swiftness of hand labor in American factories. Here it is also a matter of minor significance that a girl gets \$9 to \$10 a week, when she is thereby enabled to fasten the wheel in 1,600 watch cases, handling four pieces in each case (the wheel, two washers and the pinion wire), as a day's work. Only with such labor, appliances and systematizing is it possible to make a watch containing 58 pieces which collectively have passed through 370 single operations, at so abnormally low a price.

The relative indifference of high day wages when brought side by side with such astonishing results, is more apparent yet when we deal with industries where automatic machinery is employed almost exclusively. Screw-making, nail-making, pin-making, etc. In the latter industry the coil of brass wire is put in its proper place, the end fastened, and the almost human piece of mechanism, with its iron fingers, does the rest of the work. One machine makes 180 pins a minute, cutting the wire, flattening the heads, sharpening the points, and dropping the pin in its proper place. 108,000 pins a day is the output of one machine. A factory visited by me employed 70 machines. These had a combined output per day of 7,500,000 pins or 300 pins to a paper—25,000 papers of pins, allowing for stoppages and necessary time for repairs—say 20,000 papers. These machines are tended by three men. A machinist with a boy helper attends to the repairing. It will not materially influence the price of pins whether the combined earnings of these five men be \$7.50 or \$10 per diem.

The difference would amount to one-eighth of a cent on a paper of pins. The likelihood is that when cheaper help is employed a greater number of hands would be employed for the same work and the same output.

This applies to all industries, but principally to those which can be conducted by highly developed and organized labor. The boot and shoe industry is a brilliant example. I found on samples, the products of Lynn factories, which I had brought with me for comparison, that no foreign manufacturers were able to compete with American factories in the cheapness of the labor price. Here at Lynn a pair of ladies' gaiters is made as low as 35 cents for the labor, including the making of 24 buttonholes and sewing on of buttons, and in country shops as low as 25 cents for the same kind with about 10 buttonholes in each. I made comparisons in different places. In Vienna, in Berlin, in Frankfort, and in Offenbach I found the labor cost to be double, while the earnings were less than half what they are here. In Erfurt where wages are lower yet than in any of the mentioned places the cost is lower, but the goods are inferior and still nearly 100 per cent. higher in the labor cost than in my sample of country-shop gaiters of American manufacture. The factories work with American machines, but the output falls way behind ours. Along with this a great deal of handwork made in the homes of shoemakers—domestic industry—is run in, both for export and home trade. I do not enter into an explanation of these phenomena here, neither their bearings or their causes. I shall in a later report with fuller data attempt to point out the causes which produce these varying effects. I only desire, now, in a cursory review of the methods under which the world's industries are conducted, to enforce the necessity of conducting investigations specifically and not from a "general average" standpoint, which necessarily leads to erroneous deductions.

To show the extent to which industrial production persists in the line marked out, I point to Germany, certainly now one of the most progressive states. Still, according to the Industrial Census of 1882, more than one-half of all its population engaged in manufactures where small groups of

workers can at all be employed, were employed in groups of less than 5 to each establishment. In

	A Total of	Worked in groups of less than 5 persons.	Worked in groups of more than 5 persons.
In metals.....	459,713	298,125	161,588
In machinery, instruments, etc.....	356,089	127,565	228,524
In chemicals.....	71,777	16,867	54,910
In textiles.....	910,089	440,573	469,516
In paper and leather industries.....	221,688	107,293	114,395
In wood industries.....	469,605	367,688	102,007
In nutriment, food and drink.....	743,881	468,652	275,229
Total.....	3,232,932	1,826,763	1,406,169

Organizations large enough for profitable employment of power machinery would have to be aggregates of many more than five persons. The number of people employed in domestic industries, those working in their own homes, for account of business-houses, merchants, exporters or manufacturers, is very large. A total of 754,550 persons are so engaged. The kingdom of Saxony alone employs 138,000 persons and Rhenish Prussia and Westphalia 102,000 in domestic industries. 230,000 are engaged in textiles, mostly in weaving. Hosiery still occupies over 40,000 people in house-industry. The principal lines in textiles occupy in home-industries the following position ; I set side by side the total of all engaged in the representative branches :

Percentage of all Employed.		Engaged in House-Industries.	Total in Industry.
	<i>Per cent.</i>		
Silk weaving and velvet (Rhenish Prussia 49,022)...	70	53,286	76,264
Woolen weaving	22	23,799	108,007
Linen "	40	41,045	103,808
Cotton "	42	52,295	125,591
Mixed goods weaving	30	22,212	73,750
Knit goods, hosiery (kingdom of Saxony only, 33,513)	55	40,528	73,828
Total.....	42	233,165	561,248

In woollens 22 per cent., in mixed goods 30 per cent., in cotton 42 per cent., in silk 70 per cent. and in knit goods 55

per cent. of all weavers are still plying their looms or work their frames in their own homes in the fashion of the fathers.

In boots and shoes of 398,757 shoemakers, only 25,768 work in groups of more than five persons. But even these are not of a higher ratio than 14, being distributed over 1,839 establishments.

In metals, a line where so much of our automatic machinery is so tellingly employed, the employment groups are of an equally low ratio.

	Total No. of employed.	In groups of less than 5.	In groups of more than 5.	No. of establishments.	No. of persons in larger groups employed in each establishment.
Coppersmith ware.....	9,198	6,940	2,258	147	15
Lead and tinware.....	4,610	2,158	2,452	113	22
Composite metals.....	30,003	7,410	22,693	760	29
Tinsmith ware.....	46,158	34,884	11,274	457	25
Nails, screws, &c.....	23,609	11,784	11,825	267	44
Safes and heavy ironware, blacksmithing, &c.....	63,467	51,127	12,340	976	12
Cutlery, &c.....	55,889	34,312	21,577	825	26
Watch and clock making.....	26,208	21,100	5,108	156	33
Mathematical instruments, &c.....	15,073	7,591	7,482	384	20

If the classification into groups were carried further than "groups above 5" and groups of 5 to 10 and of 10 to 20 were given we should see plainly, what the above figures indicate—the small number of people employed in establishments conducted on a basis large enough to make production on the plan on which it is conducted mainly in America, at all possible.

If these illustrations and figures prove anything, they prove beyond doubt the necessity of basing comparisons on homogeneous positive facts.

It is a common belief that with the rapid exchange of ideas, the closer relations of nations characteristic of our age, the methods and systems under which work is conducted by an industrially more advanced nation, will soon be taken up by all competitors. Measurably this may be true; so far as

outside appearances go, even to an appreciable extent. On close examination we find, however, that the thick crust of imperturbability of national predilections is not easily penetrated by new ways, methods, and ideas. Many counteracting influences have to be overcome before one nation's system of work will perform the same result after adoption by another. The spring to man's activity to the exercise of all his functions, lies deeper than that mere arbitrary will or individual action exercised from without could effect rapid and violent changes. While these differing features, in the productive methods of nations, are visible at a first glance, it is evident that production must also be largely influenced by them. Preëminently production taken quantitatively. But much as the results of labor measured by numbers, length or whatever term may be called in for covering dimensions, may be influenced by the methods and factors mentioned, the side which cannot be measured by the common standard, the side appealing more directly to the eye. Taste is still more greatly influenced by these national, popular, latent instincts. It would be useless to expect of one nation the same coloring, expression, ornament, or artistic production as from another. In one the sense of color predominates, in another the sense of form. Here, more than in any other side of production, the national habits, the means, and methods exert a great influence. Here, in quite a number of instances, the same results could not be obtained by any other method than the prevailing one. We cannot expect production mainly conducted by machinery or with an eye to turning out big quantities to cover the same ground or bring out like results as where painstaking regularity, inherited skill, and an intuitively trained eye direct the hand of the worker tied to his domestic industry and produce an individualization of products not obtainable otherwise. In one country the traditions, habits and aims of government unite to make the people persevere in the old methods. The small industry of the craftsman, the hand-loom weaver, the decorator, the metalworker in his own smithy, the domestic industry is fostered and considered the ultimate goal to which we have to return again. In another country, where traditions

and habits do not so strongly point in that direction, industry is left more to itself to shape its own course. Everywhere, however, we detect the most varied manifestation of national activity. The methods by which production is carried on are as varied as the products themselves. Different as these are in all respects, it is as unreasonable to expect of one nation the same work and results as of another, as it would be useless to engraft upon one nation an exact copy of the methods of another, because the latter have been found to bring out good results there.

Referring to American conditions generally, it may be stated that where data collected in Europe enable me to make comparisons, I find, even in industries which are the least able to compete with Europe, that the labor-price differences are not material. The causes are mainly in the price-differences in the material, raised by tariff taxation and tariff influences. Manufacturers, as well as their fellow-men, outside of factories look to the week or day earnings of operations in foreign countries and base their comparisons of labor cost thereon. We know from the aforesaid how misleading this is. Still we have no data for correct comparison. Our census statistics have had to serve in lieu thereof. They are collected for a different purpose, and we need not find fault if they do not answer the needs of more minute requirements. "Woolens" may serve as an illustration. Shoddy goods, all-wool goods, dress goods and heavy woolens are all classed under one heading, and inferences are drawn from the columns devoted respectively to material, labor and general product. In my recent inquiries I obtained reliable data from a mill making shoddy goods and all-wool cassimeres, from a mill making pure wool goods only, and from a mill making flannels and all-wool sackings and dress goods. In goods (cheviots) composed of two-thirds shoddy and one-third wool I find the cost of material, including dyestuffs, to be about 32 cents per pound of finished goods and the labor cost, inclusive of 2.81 cents for office expenses and superintendence, is 26.30 cents per woven yard. These goods weigh 16 to 18 ounces a yard, and the net labor per pound may therefore be reduced

to 24 cents a pound, and, inclusive of office expenses, superintendence, &c., to a fraction over 21 cents a pound. This gives us the relative positions of $32 + 21$, or in a hundred in round numbers—60 per cent. material and 40 per cent. labor. In all-wool goods of the same mill the cost of materials rises to 80 cents per pound, while the labor cost is rather less than more, and is fully expressed by 20 cents a pound—in per cent. 80 material and 20 labor. In a mill making all-wool goods only I find these relations verified. Aggregating things of such unequal dimensions and drawing averages therefrom must lead to confusing applications, and confused results. If this is the case with statistics of material and of labor in the columns assigned to them, it is more so yet in what we have as “general product.” This covers often supplies, profits, general expense, selling expense, interest, discounts, generally of a very elastic nature, and a multiplicity of items too numerous to mention. While in some these would be more than the combined cost of labor and material, in others they would form only an inconsiderable part of the general cost. If for general use these data are therefore not more than an index of national development, used for comparisons, and bases of operative reasoning, they become misleading, unless we can find counter positions of equal values, a possibility which the aggregation of dissimilar parts excludes. For international comparisons they would be less than useless, as then new elements of uncertainty would interfere. There is no other basis for comparison than that of like and like—homogeneity. For this the data have to be found. We have absolutely none. An inquiry into the cost of labor in production, or rather in specified articles of production, at once opens the whole wide vista of the industrial problem. We then see side by side nation and nation in their whole productive potency, expressed by an unerring standard of measurement—price. When we know that it costs 20 cents in America in labor to scour, card, dye, spin, weave and finish sufficient wool to make a pound of cloth, flannel, dress-goods of a certain fineness and count, then we have an absolute, a certain, a scientific basis of inquiry. We know that if the labor cost of the

same operations in Germany, France or England is 17 cents, that our labor costs 3 cents more, or if 23 cents, that our labor costs 3 cents less than the same amount and quality of labor in foreign countries, expended in the same amount of product; no matter what the relative earnings are. I have not been able to cover in my inquiries abroad like cases and goods in woollens. The dissimilarity of apparently like goods is especially great in woollens. Still in goods made in Ireland, with day earnings perhaps of the lowest in Europe, on comparison I find but a small difference in the cost of labor, while there is a very great difference in the cost of the wool between here and there. The earnings, however, are nearly three times as high in American first-class woolen mills.

To illustrate this by a specific example I may mention here an Irish woolen mill of recent build, where the weekly output per weaver was given to me as averaging 50 yards about double-width tweed. The price paid for weaving 48 yards is 10/—or \$2.40, or 5 cents a yard. The earnings per week per weaver average about 11/—or \$2.64. In the American mill referred to above, making chevots and kerseys, the monthly earnings average \$34.63, or counting 26 working days, \$7.99 a week. At first sight this would indicate that competition on equal terms is all but impossible. Still, the wages paid per yard for the goods referred to run from $6\frac{1}{2}$ to $8\frac{1}{2}$ cents per yard, 54 inches wide. These goods, however, are all of a finer count, more threads to the inch, and if we had the same goods for comparison we should probably find the weaving cost per yard but slightly differing from that paid in Ireland. This can only be accounted for by the output being sufficiently high in American mills to cover thereby the indicated differences. And this is the case, as the average monthly output per weaver in this mill is 482 yards, or with 21 working days, 111 yards per week. But even here the output varies between 120 and 735 yards per weaver. The smaller output is that of beginners.

The 65 looms of the mill divided as follows:

	3	below	200	yards.
	5	between	200	and 300 yards.
	5	"	300	" 400 "
	21	"	400	" 500 "
	17	"	500	" 600 "
	12	"	600	" 700 "
	2	respectively	716	and 735 yards.

It is apparent from this that the labor price per piece need not necessarily be high because the earnings are high. The earnings vary with the skill and energy of the operator. Extended into wide fields of inquiry the statement will undoubtedly find further corroboration.

I have the honor to be, sir,

Your obedient servant,

J. SCHOENHOF.

